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EP 1085442 A2

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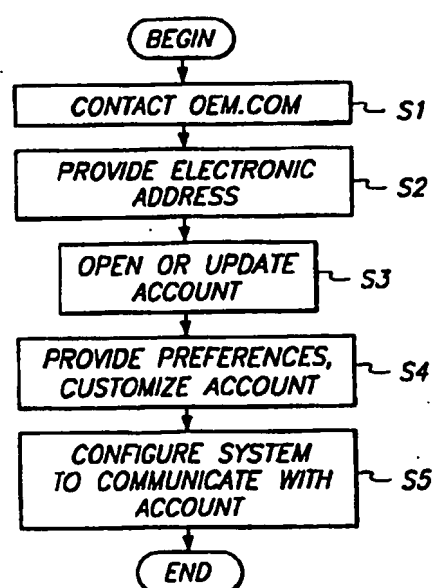
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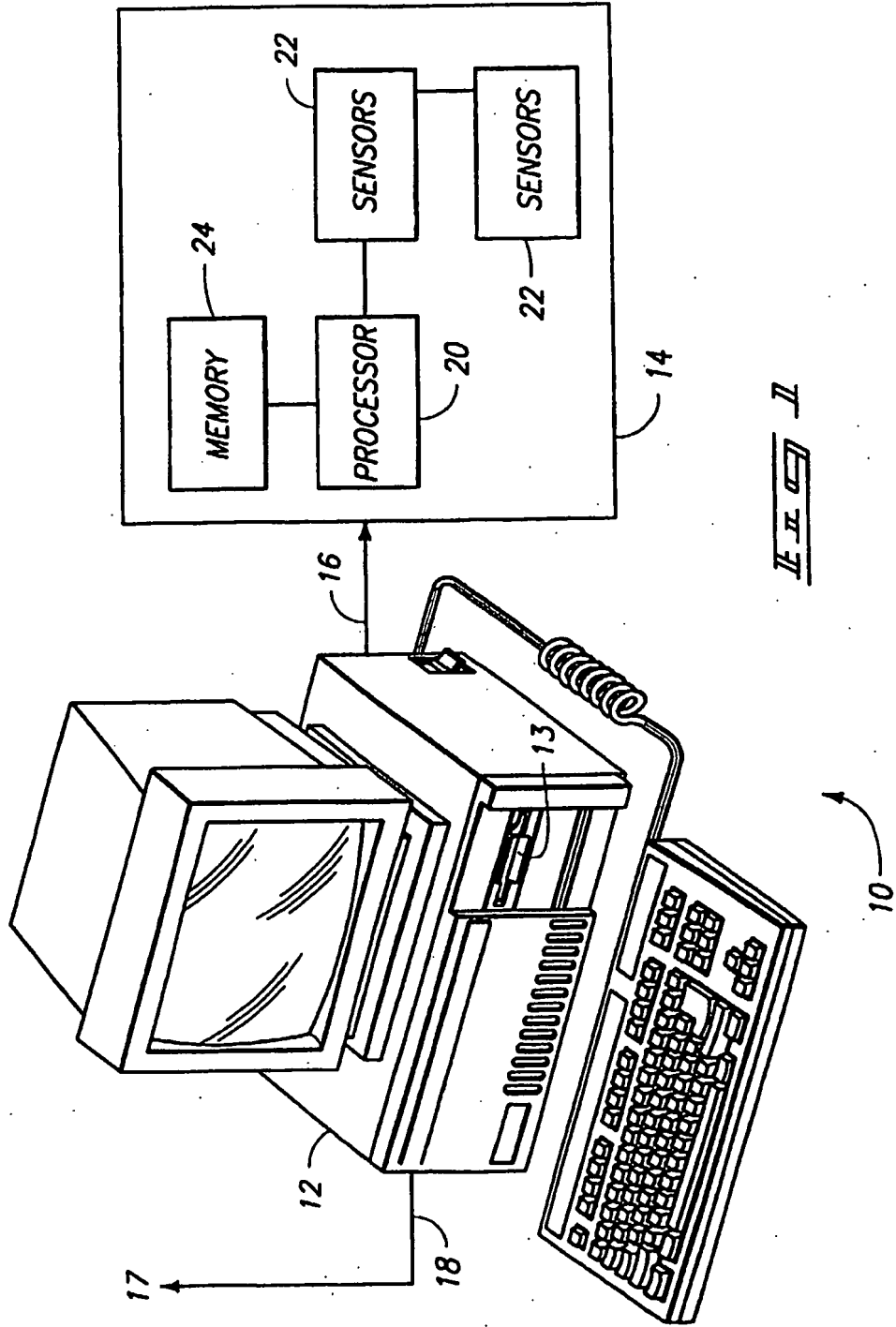
(54) Abstract Title

**Hardcopy output engine consumable supply management**

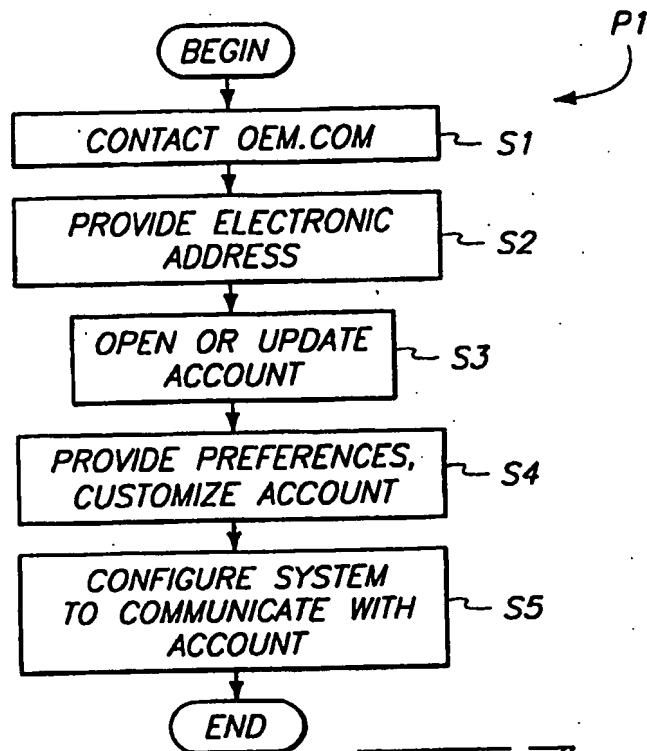
(57) A method (P1) of including a hard copy output engine (14) in an account includes initiating electronic communication with a supplier, providing an electronic address to the supplier and sending an electronic signal updating account information. The method (P1) also includes sending an electronic signal customizing the account and providing information to a controller coupled to the hard copy output engine (14) to facilitate communication with the account.



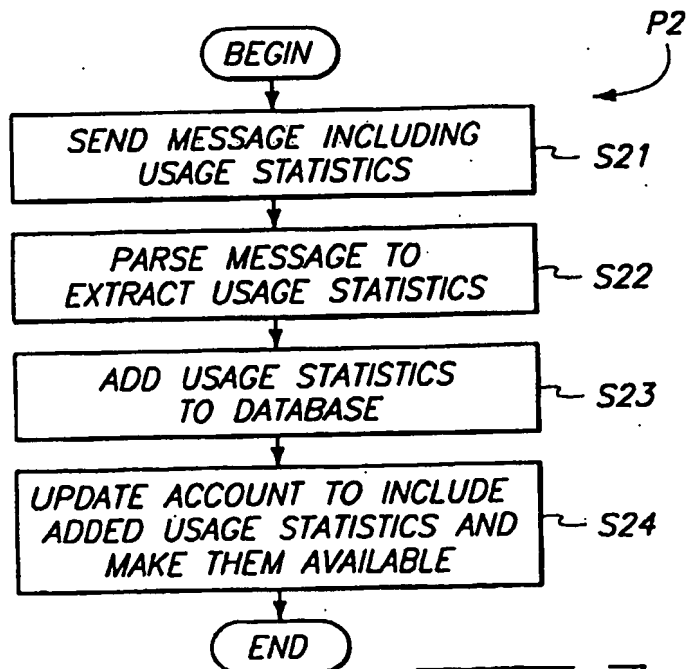
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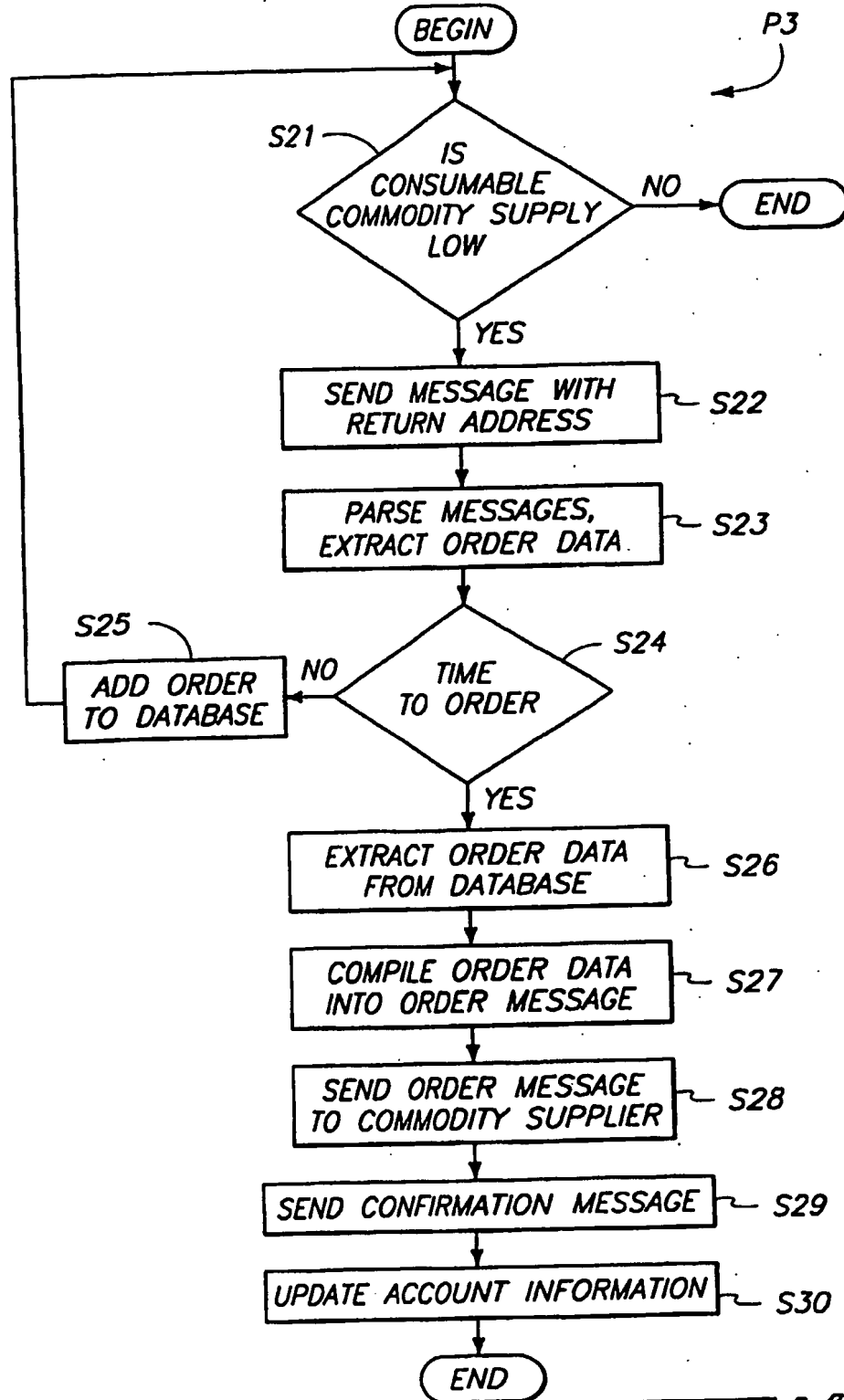


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## HARDCOPY OUTPUT ENGINE CONSUMABLE SUPPLY MANAGEMENT AND METHOD

### FIELD OF THE INVENTION

The invention relates to printers and other hard copy output engines. More particularly, the invention relates to electronically ordering replacement consumables for a hard copy output engine from that hard copy output engine.

### BACKGROUND OF THE INVENTION

5 As computer systems and data communications systems have developed, the number and variety of hard copy output engines employed in a typical office or factory setting has grown. Examples include photo copiers, facsimile machines, printers and devices including more than one of these  
10 capabilities. In turn, this has led to a need to be able to order greater number of consumable supplies, some of which are specific to specific types of hard copy output engines.

As need for these types of hard copy output engines has grown, a number of different manufacturers have each developed different hard copy  
15 output engines providing different operational characteristics and capabilities. While some consumables associated with these devices are common to most or all such devices (e.g., standardized paper sizes), other consumables, such as toners and toner supply cartridges or ink reservoirs, tend to be unique to a specific manufacturer and to specific models of hard copy output engines from  
20 each manufacturer. Additionally, different hard copy output engines may have different paper capacities, capabilities for accepting more or fewer paper sizes and different toner or other pigment supply requirements and capacities.

It is generally helpful to have a mechanism for keeping track of usage of consumables in keeping computer systems functional. For example, it is  
25 extremely helpful to ensure that adequate supplies of replacement paper and toner or ink are available when needed.

Coordination of orders for supplies can be very helpful to avoid over- or under-stocking of these consumables, while still achieving the benefits of economies of scale by pooling orders to service multiple hard copy output engines, especially those using at least some of the same consumables.

- 5 However, in many business settings, the sheer number of diverse hard copy output engines being used in different aspects or divisions of the business may lead to confusion in maintaining adequate supplies of these consumables for each type of hard copy output engine.

- 10 What is needed is a way to facilitate provision of consumables, as well as data describing consumable status, for a network including one or more hard copy output engines.

### SUMMARY OF THE INVENTION

- 15 In accordance with an aspect of the present invention, a method of including a hard copy output engine in an account includes initiating electronic communication with a supplier, providing an electronic address to the supplier and sending an electronic signal updating account information. The method also includes sending an electronic signal customizing the account and providing information to a controller coupled to the hard copy output engine to facilitate  
20 communication with the account.

- In accordance with another aspect of the present invention, a method of obtaining consumable supplies for a hard copy output engine includes determining that an amount of a consumable for the hard copy output engine is less than a threshold amount and sending an electronic signal to a supplier of  
25 consumables. The electronic signal includes information describing the consumable and includes a return address for electronic signals. The method also includes receiving a reply message including information describing status of an order for the consumable .

- 30 In accordance with yet another aspect of the present invention, a computer implemented control system for a hard copy output engine includes a

memory coupled to the hard copy output engine and configured to store data representing an electronic address for a supplier of consumables for the hard copy output engine. The control system also includes processing circuitry coupled to the hard copy output engine and to the memory. The processor is  
5 configured to determine that an amount of a consumable for the hard copy output engine is less than a threshold amount, and, in response thereto, extract the electronic address from the memory, initiate communication with the supplier using the electronic address and receive a reply message including information describing status of an order for the consumable .

10 Other features and advantages of the invention will become apparent to those of ordinary skill in the art upon review of the following detailed description, claims and drawings.

#### DESCRIPTION OF THE DRAWINGS

Fig. 1 is a simplified block diagram of a computer network including a  
15 computer and a hard copy output engine, in accordance with an embodiment of the present invention.

Fig. 2 is a simplified flowchart illustrating a process, in accordance with an embodiment of the present invention.

Fig. 3 is a simplified flowchart illustrating a process, in accordance  
20 with an embodiment of the present invention.

Fig. 4 is a simplified flowchart illustrating a process, in accordance with an embodiment of the present invention.

#### DETAILED DESCRIPTION OF THE INVENTION

25 Fig. 1 is a simplified block diagram of a computer network 10 including a computer 12 and a hard copy output engine 14, in accordance with an embodiment of the present invention. The computer 12 is coupled to the hard copy output engine 14 via a bus 16 allowing either the computer 12 or the hard copy output engine 14 to initiate data communications with the other. In  
30 one embodiment, the hard copy output engine 14 is a device such as a printer,

copier, mopier, facsimile machine, or a multifunction device capable of providing two or more such functions. In one embodiment, the system 10 is coupled to an external interconnection 17 via a data path 18. In one embodiment, the data path 18 includes an intranet. In one embodiment, the data path 18 includes a local area network (LAN) or wide area network (WAN). In one embodiment, the data path 18 includes Internet access.

In one embodiment, the computer 12 and the hard copy output engine 14 are capable of exchanging data via a protocol compatible with presence of other computers 12 or hard copy output engines 14 on the bus 16. In one embodiment, the computer 12 and the hard copy output engine 14 employ an object-oriented request-reply protocol supporting asynchronous printer query, control and monitor capabilities, and that is capable of documenting the requests, replies and data types supported by the protocol.

In one embodiment, the data path 18 provides common gateway interface (CGI) data communication capability. In one embodiment, the data path 18 includes an email capability (e.g., simple mail transfer protocol or SMTP) for facilitating data communication. In one embodiment, the data path 18 includes a secure data path using HTTP (hyper text transfer protocol ) with SSL (secure sockets layer), as is described in more detail in U.S. Patent No. 5,657,390, entitled "Secure Socket Layer Application Program Apparatus And Method", issued to Elgamal et al. and U.S. Patent No. 6,081,900, entitled "Secure Intranet Access" issued to Subramanian et al., which patents are hereby incorporated herein by reference for their teachings.

The hard copy output engine 14 includes a controller 20, such as a conventional microprocessor or microcontroller. The hard copy output engine 14 also includes one or more sensors 22 coupled to the controller 20 and a memory 24 in data communication with the controller 20. In one embodiment, the non-volatile memory comprises an electrically alterable read only memory (EAROM). In one embodiment, the memory 24 includes an electrically programmable read only memory (EPROM). In one embodiment, the memory 24 includes a write-once, read-many memory (WORM). In one



embodiment, the memory 24 includes magnetic, magneto-optic or optical storage media, such as conventional disc storage or floppy disc data storage units, or CD-ROMs or the like. In one embodiment, the memory 24 includes random access memory. In one embodiment, the memory 24 is capable of  
5 being externally programmed with data and then storing the data for extended periods of time during which the hard copy output engine 14 may not have access to an external source of electrical energy (.e.g, during shipment from a manufacturer or distributor of hard copy output engines 14 to an end user or destination geopolitical area).

10 The sensors 22 are coupled to consumables associated with the hard copy output engine 14. In one embodiment, when the sensors 22 report that a quantity of a consumable (e.g., paper, toner or ink) associated with the hard copy output engine 14 has decreased to below a predetermined threshold amount, or that malfunction of a dispenser of a consumable exists, the  
15 controller 20 initiates a data communication ultimately intended for transmission via the data path 18, as is described below in more detail with reference to Figs. 3 and 4, using data programmed into the hard copy output engine 14, as is described below in more detail with reference to Fig. 2.

Fig. 2 is a simplified flowchart illustrating a process P1, in accordance  
20 with an embodiment of the present invention. The process P1 begins with a step S1.

In the step S1, electronic contact is initiated from the system 10 to a manufacturer that produced the hard copy output engine 14. In one  
embodiment, contact is initiated using simple mail transfer protocol. In one  
25 embodiment, contact is initiated using hyper text transfer protocol. In one embodiment, contact is initiated using hyper text transfer protocol with secure sockets layers.

In a step S2, an electronic address for the system 10 is provided to the manufacturer. In one embodiment, the electronic address is an email  
30 address for facilitating communication originating from the manufacturer or from representatives who have been contacted by the manufacturer.

In a step S3, an account with the manufacturer is opened or updated. When the system 10 is affiliated with an organization or individual that has had previous interactions with the manufacturer that gave rise to an account, that account is updated to reflect that the organization or individual has an additional  
5 hard copy output engine 14. When the system 10 is not affiliated with any existing account holder, a new account is opened, and the new account reflects the new hard copy output engine 14.

In a step S4, the system 10 and the manufacturer interact to provide preferences that the user of the system 10 dictates. For example, the user may  
10 prefer to order consumable supplies through a particular third-party reseller of consumables (e.g., OfficeMax, Staples etc.), and the manufacturer will accept this information and include this information in association with the account. The user will need to specify a physical address for accepting delivery of consumables. Additionally, the user may have a preferred approach to paying  
15 for purchases of consumables, such as a specific bank account or credit account. For further example, the user may want to have the account organized to collect and collate usage information, such as consumption of consumables, keeping track of print jobs by requester, size, time or other system usage data.

In a step S5, the system 10 is configured to be able to communicate  
20 with the manufacturer. In one embodiment, a URL or an email address for the manufacturer is stored in the system 10. In one embodiment, a URL or an email address for the manufacturer is stored in the memory 24, allowing the controller 20 in the hard copy output engine 14 to initiate communication with the manufacturer. The process P1 then ends.

25 Fig. 3 is a simplified flowchart illustrating a process P2, in accordance with an embodiment of the present invention. The process P2 begins in a step S21.

In the step S21, a message including usage statistics relevant to the hard copy output engine 14 is sent to the manufacturer. In one embodiment,  
30 the controller 20 in the hard copy output engine 14 collates usage statistics and then compiles an email including the usage statistics, which email is sent to the

manufacturer using the electronic addressing information stored in the step S5 of the process P1. In one embodiment, the step S21 is carried out periodically. In one embodiment, the step S21 is carried out after accumulation of a predetermined amount of data. In one embodiment, the step S21 is carried out  
 5 in response to user-selectable criteria.

In a step S22, the message sent in the step S21 is parsed to extract the usage statistics and usage statistics from one or more of the messages sent in the step S21 are compiled.

In a step S23, the compilation of the usage statistics is added to a  
 10 database that is accessible to the user. For example, the manufacturer may establish a personal web page for the user to facilitate review of usage statistics for the hard copy output engine 14 of Fig. 1, or for a family of hard copy output engines 14 that are associated with the user. The process P2 then ends.

Fig. 4 is a simplified flowchart illustrating a process P3, in accordance  
 15 with an embodiment of the present invention. The process P3 begins with a query task S21.

In the query task S21, the controller 20 determines when a supply of a consumable has decreased below a threshold amount. In one embodiment, the sensors 22 of Fig. 1 provide signals to the controller 20 indicative of a  
 20 remaining amount of consumables. In one embodiment, the sensors 22 provide data indicative of predetermined increments, e.g., 25 %, 50% and the like. In one embodiment, the sensors 22 provide data indicative of actual remaining amounts of consumables. In one embodiment, the threshold amount is user-settable and re-adjustable in response to user commands input via the computer  
 25 12, for example. In one embodiment, the sensors 22 are also capable of indicating malfunction or failure of a supply of a consumable, such as a failing toner cartridge that is still functioning but that is unlikely to continue to provide functionality for long or that will shortly provide unacceptable hard copy output quality.

30 When the query task S21 has determined that the supply of the consumable has decreased below the threshold amount, an external agent is

notified of this event in a step S22. An electronic address for the system 10 or for the hard copy output engine 14 that had been previously stored in the memory 24 is also made available in the message sent in the step S22.

5 In a step S23, the message that was sent in the step S22 is parsed to extract information about the consumable in order to be able to compile order data. The electronic address for the system 10 or hard copy output engine 14 is also extracted from the message sent in the step S22.

10 In a query task S24, the process P3 determines when it is time to place an order for consumables including the consumables described in the message sent in the step S22. In one embodiment, orders are placed periodically (e.g., every Friday) in response to all messages sent in the interval since the last order was placed. In one embodiment, orders are placed in response to accumulation of orders representing a predetermined quantity of consumables. In one embodiment, orders are sent when both an accumulation  
15 of orders representing a predetermined quantity of consumables and a periodic criterion is met.

When the query task S24 determines that it is not yet appropriate to place an order, a step S25 adds an order for the consumable to a database, and control passes back to the query task S21. When the query task S24  
20 determines that it is appropriate to place an order, control passes to a step S26.

In the step S26, order data from one or more messages such as the messages sent in the step S22 are extracted from the database.

In a step S27, order data extracted from the database in the step S26 are compiled into an order message. The order message includes shipping  
25 information such as the physical address associated with the system 10 or the hard copy output engine 14.

In a step S28, the order message is optionally sent to a consumable supplier, such as a reseller of consumables that was specified in the step S4 of the process P1. When the account holder has not specified a reseller or other  
30 vendor, the manufacturer fills the order.

In a step S29, a confirmation message is sent to the system 10, the hard copy output engine 14 or to the return electronic address supplied in the step S2.

5 In a step S30, the account is updated to reflect the order message that was sent in the step S28. As a result, usage statistics relevant to consumption of consumables are available, for example via a custom web page. The process P3 then ends.

10 In one embodiment, signals exchanged between the hard copy output engine 14 and the computer 12 via, for example, the bus 16, allow the computer 12 to initiate communication with the vendor or supplier via a web page using a URL that had been stored in the memory 24. In one embodiment, the data from the memory 24 invoke a servlet, as described in more detail in U.S. Patent No. 6,012,098, entitled "Servlet Pairing For Isolation Of The Retrieval And Rendering Of Data and issued to E.N. Bayeh et al., which patent is  
15 hereby incorporated herein by reference.

The protection sought is not to be limited to the disclosed embodiments, which are given by way of example only, but instead is to be limited only by the scope of the appended claims.

CLAIMS

What is claimed is:

- 1           1.     A method (P1) of including a hard copy output engine (14) in  
2     an account comprising:  
3           initiating (S1) electronic communication with a supplier;  
4           providing (S2) an electronic address to the supplier;  
5           sending (S3) an electronic signal updating account information;  
6           sending (S4) an electronic signal customizing the account; and  
7           providing (S5) account information to a controller (20) coupled to the  
8     hard copy output engine (14) to facilitate communication with the account.
- 1           2.     The method (P1) of claim 1, wherein providing (S2) an  
2     electronic address to the supplier includes providing (S2) an email address to the  
3     supplier.
- 1           3.     The method (P1) of claim 1, wherein initiating (S1) electronic  
2     communication with a supplier comprises sending (S1) a message to the supplier  
3     using hyper text transfer protocol.
- 4           4.     The method (P1) of claim 1, wherein sending (S3) an electronic  
5     signal updating account information comprises:  
6           sending (S3) an electronic signal using hyper text transfer protocol,  
7     the message including financial information facilitating payment for orders of  
8     consumable supplies;  
9           including an email address in the message to enable responses to be  
10    received from the account; and  
11          sending information describing the hard copy output engine (14).
- 1           5.     The method (P1) of claim 1, wherein providing (S5) information  
2     to a controller (20) coupled to the hard copy output engine (14) to facilitate  
3     communication with the account comprises providing a universal resource  
4     locator corresponding to the supplier.

1           6.     A method (P3) of obtaining consumables for a hard copy output  
2 engine (14) comprising:  
3           determining (S21) that an amount of a consumable for the hard copy  
4 output engine (14) is less than a threshold amount;  
5           sending (S22) an electronic signal to a supplier of consumables, the  
6 electronic signal including information describing the consumable and including a  
7 return address for electronic signals; and  
8           receiving (S29) a reply message including information describing  
9 status of an order for the consumable specified in the message that was sent.

1           7.     The method (P3) of claim 6, wherein sending (S22) an  
2 electronic signal includes sending (S22) an email using simple message transfer  
3 protocol.

1           8.     The method (P3) of claim 6, wherein sending (S22) an  
2 electronic signal includes sending (S22) an electronic signal using hyper text  
3 transfer protocol.

1           9.     The method (P3) of claim 6, wherein receiving (S29) a reply  
2 message includes receiving (S29) a reply message reflective of a consolidated  
3 order for consumables.

1           10.    The method (P3) of claim 6, wherein receiving a reply message  
2 comprises receiving a hyper text transfer protocol email reflective of a periodic  
3 consolidated order for consumables.

1           11.    A computer implemented control system for a hard copy output  
2 engine, the system comprising:  
3           memory coupled to the hard copy output engine and configured to  
4 store data representing an electronic address for a supplier of consumables for  
5 the hard copy output engine; and  
6           processing circuitry coupled to the hard copy output engine and  
7 configured to:  
8           determine that an amount of a consumable for the hard copy  
9 output engine is less than a threshold amount;  
10          extract the electronic address from the non-volatile memory;  
11          initiate communication with the supplier using the electronic  
12 address; and

13                    receive a reply message including information describing status  
14                    of an order for the consumable .

1                    12.    The computer implemented control system of claim 11, wherein  
2                    the processor configured to extract the electronic address from the memory  
3                    comprises a processor configured to extract a universal resource locator address  
4                    from the memory.

1                    13.    The computer implemented control system of claim 11, wherein  
2                    the processor configured to receive a reply message comprises a processor  
3                    configured to receive a hyper text transfer protocol email reflective of a periodic  
4                    consolidated order for consumables.

1                    14.    The computer implemented control system of claim 11, wherein  
2                    the processor configured to send an electronic signal comprises a processor  
3                    configured to send an electronic signal using hyper text transfer protocol with  
4                    secure socket layers.

1                    15.    The computer implemented control system of claim 11, wherein  
2                    the processor configured to initiate communication with the supplier comprises a  
3                    processor configured to supply a return email address to the supplier.

1                    16.    The computer implemented control system of claim 11, wherein  
2                    the processor is configured to obtain updated usage information from a database  
3                    maintained by the supplier.





INVESTOR IN PEOPLE

Application No: GB 0119834.0  
Claims searched: 1 and dependent claims

13/  
Examiner: Russell Maurice  
Date of search: 28 May 2002

## Patents Act 1977 Search Report under Section 17

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UK CI (Ed.T): G4A (AUXF)  
Int CI (Ed.7): G06F (17/60)  
Other: Online WPI, EPODOC, PAJ, IEL

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Category	Identity of document and relevant passage	Relevant to claims
X, P	EP 1085442 A2 Xerox (see abstract at least)	1 at least
X, P	EP 1085441 A2 Xerox (see abstract at least)	1 at least
X	US 5305199 A LoBiondo (see whole document)	1 at least
X	WPI Abstract AN 2000-494732 [44] & JP2000187698 (Ricoh) 04.07.00	1 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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(58) Field of Search

UK CL (Edition T ) G4A AFMD AFMG AUXF

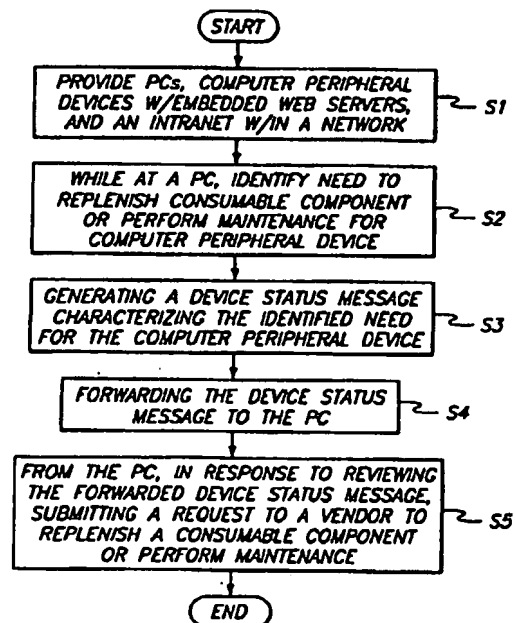
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ONLINE: WPI, EPODOC, JAPIO, Internet

(54) Abstract Title

Automatic system for ordering consumables or requesting maintenance for peripheral equipment

(57) An automatic system of ordering consumables or requesting maintenance for peripheral equipment connected to a network is provided. In use, the peripheral equipment which incorporates an embedded web server generates a device status message. The status message is received by a messaging application on a PC within the network and a web browser is used to submit a request to a provider to supply consumables or perform maintenance. The messaging system may be an E-Mail system. The peripheral may be a printer and use an SNMP structure to describe interactions details with the system.



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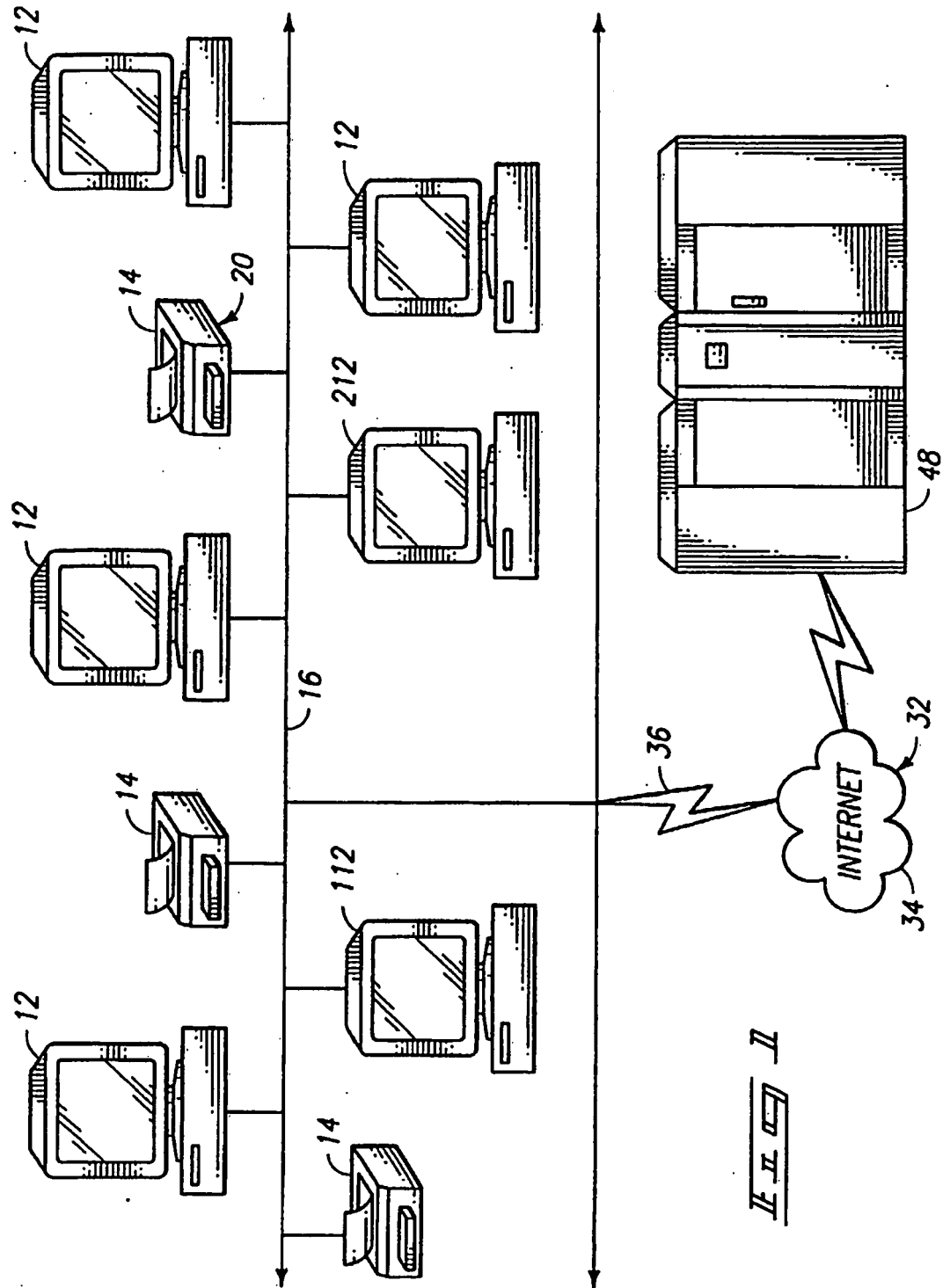
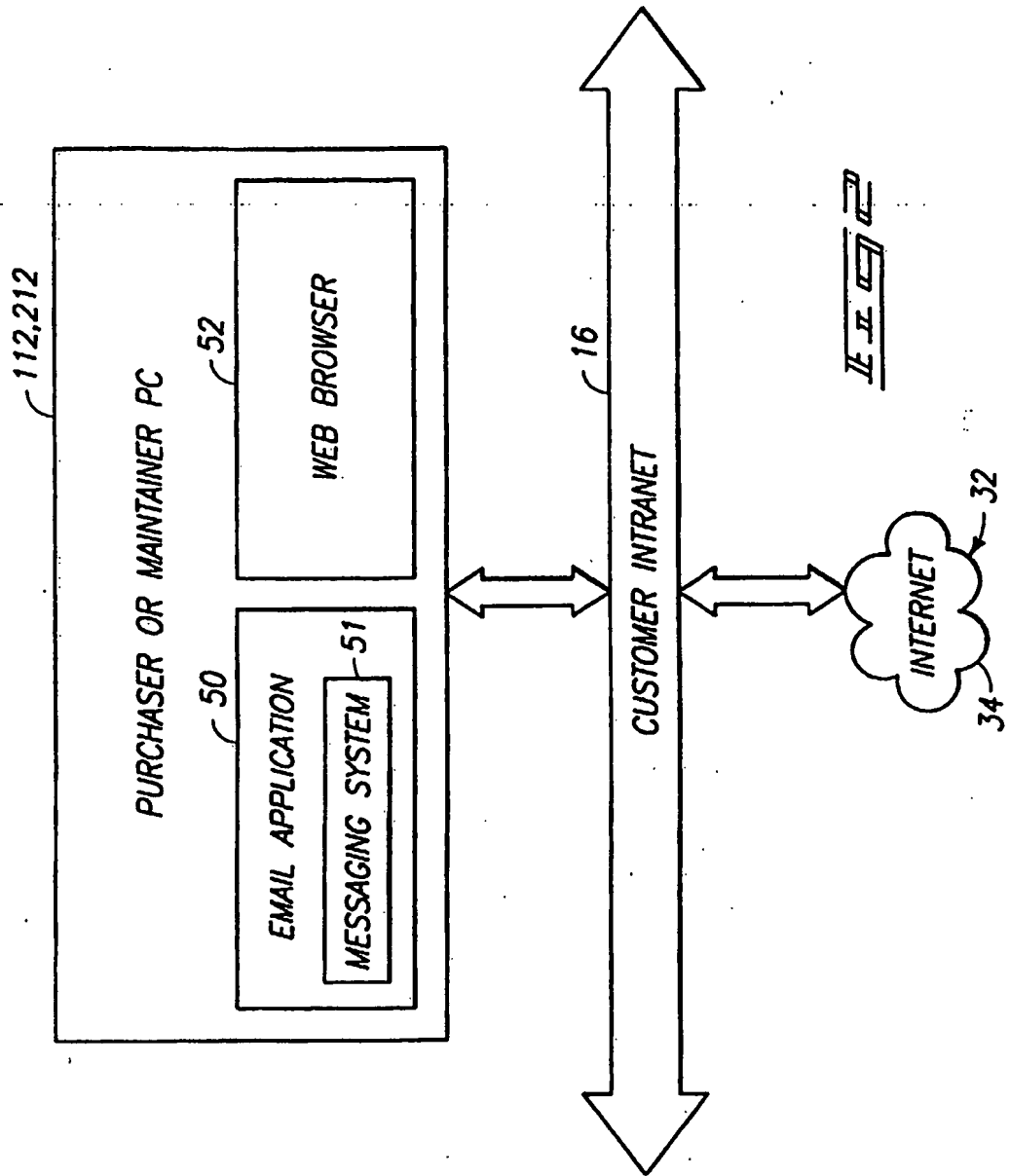
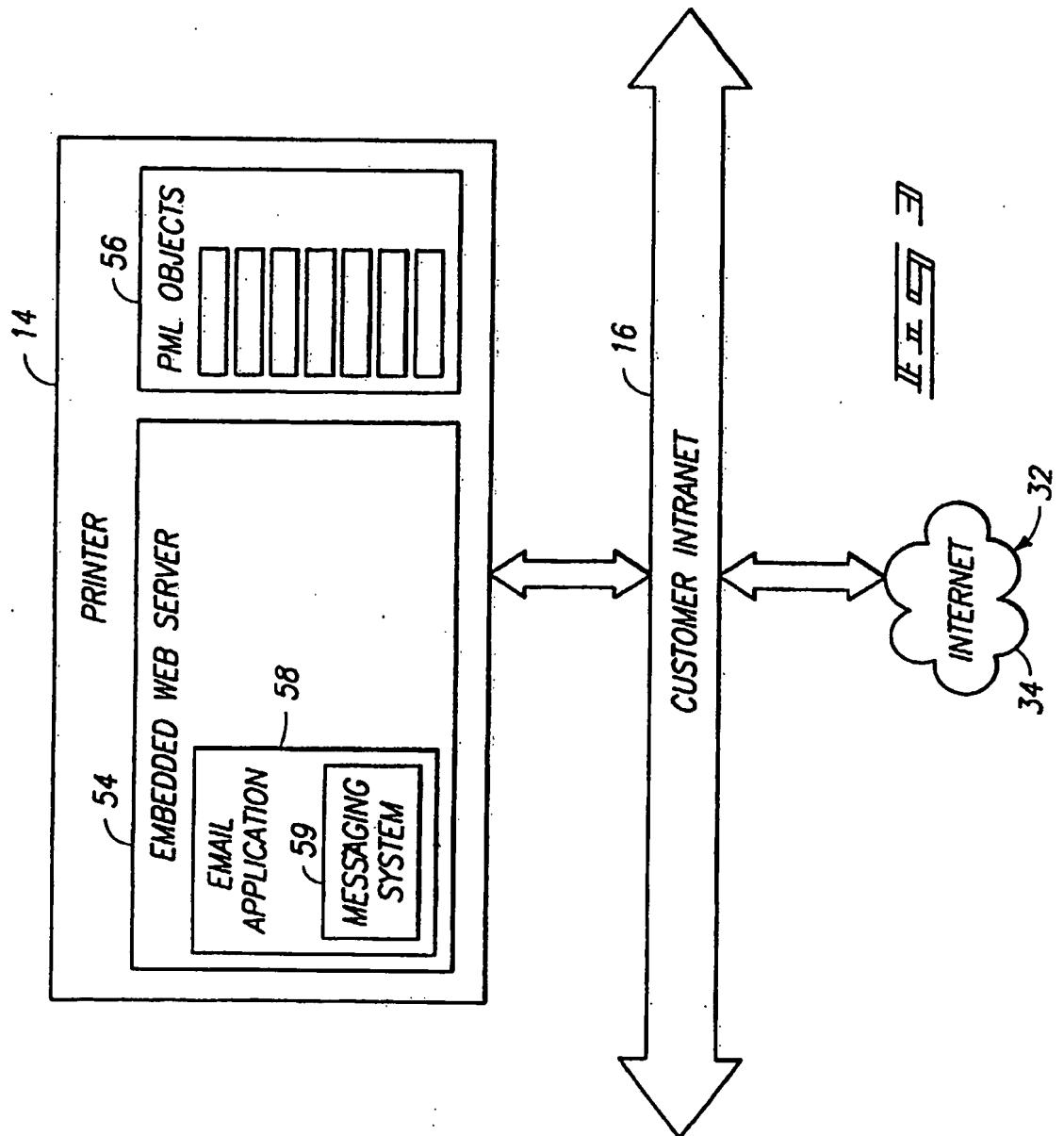
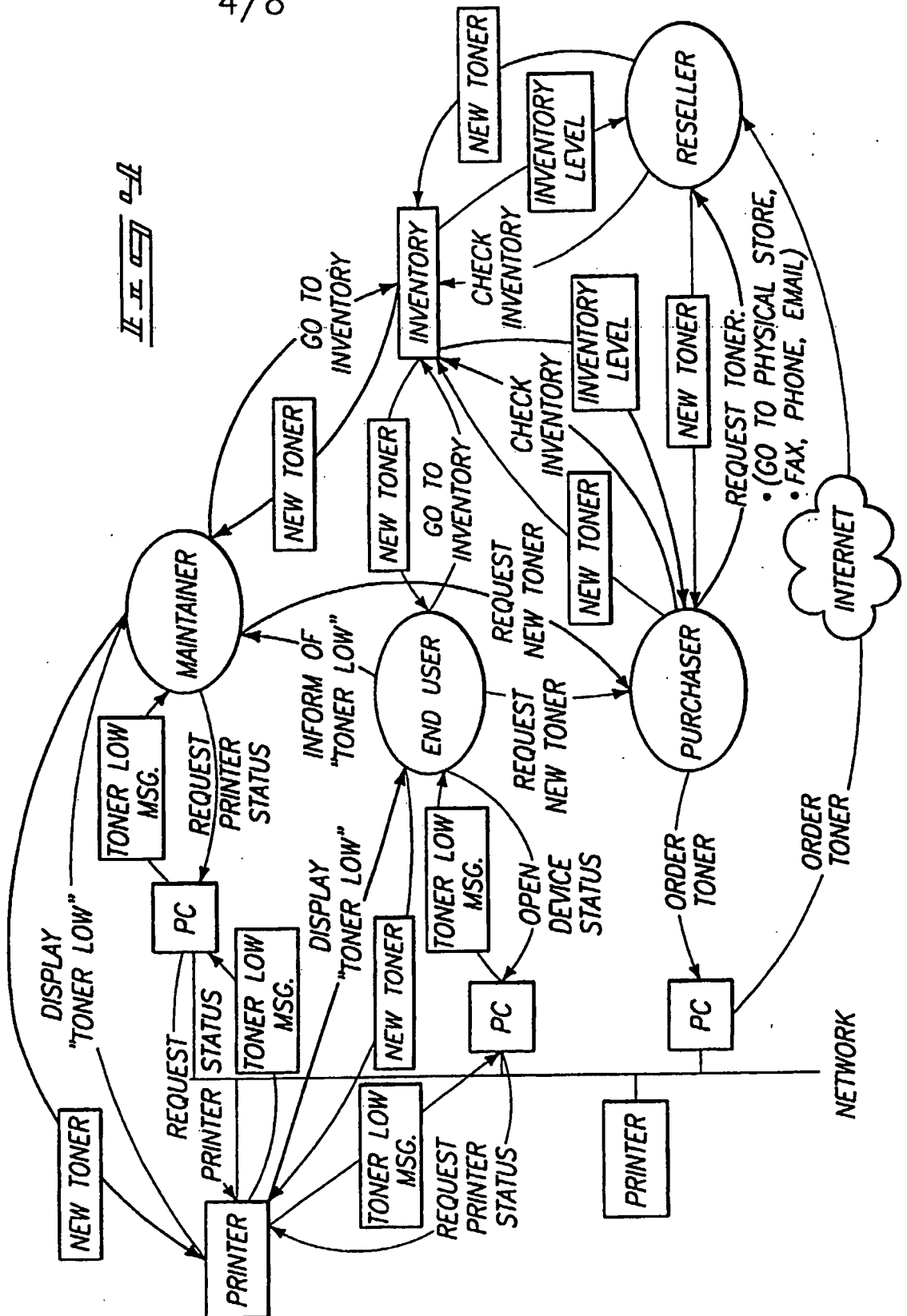
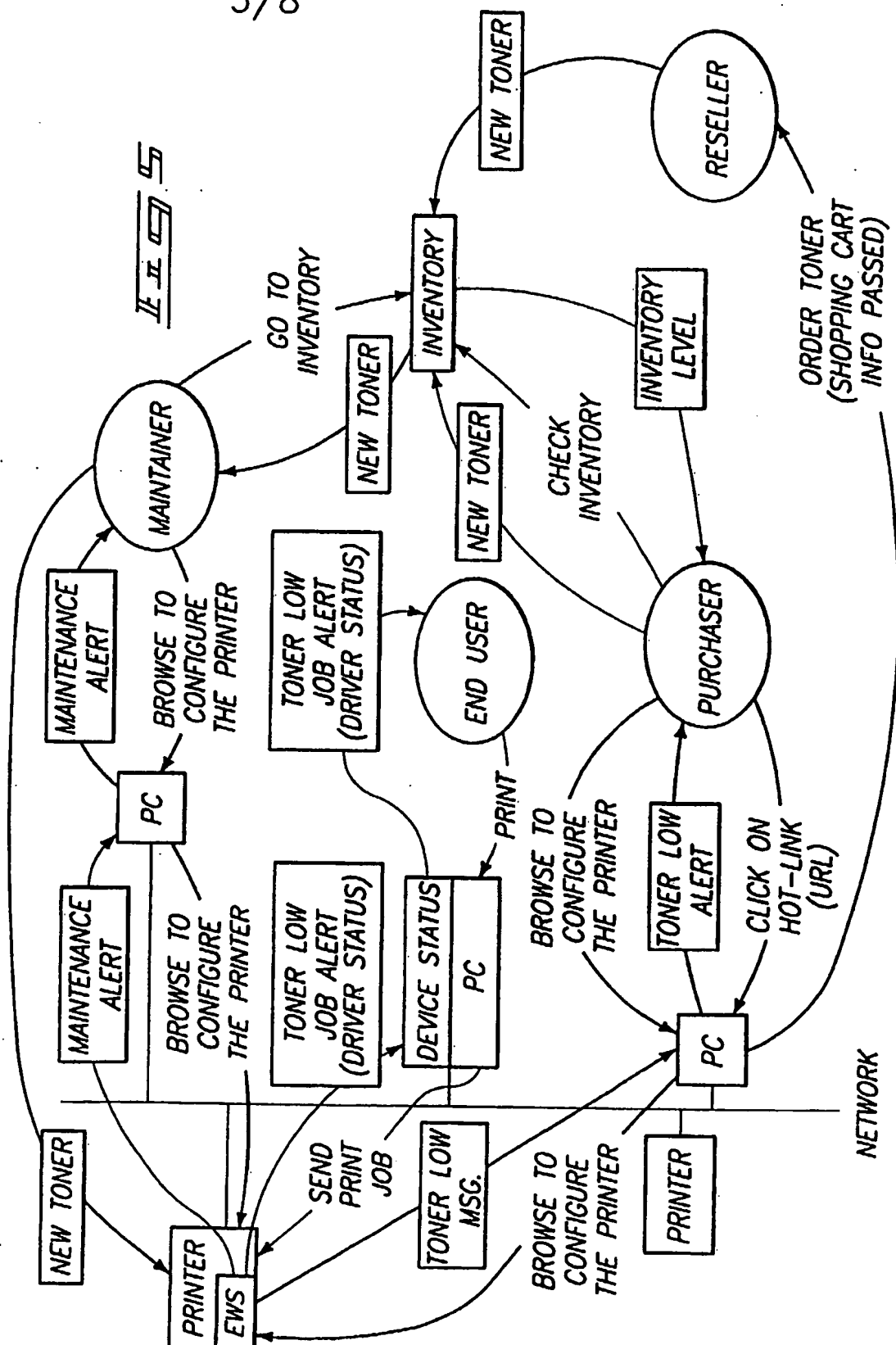


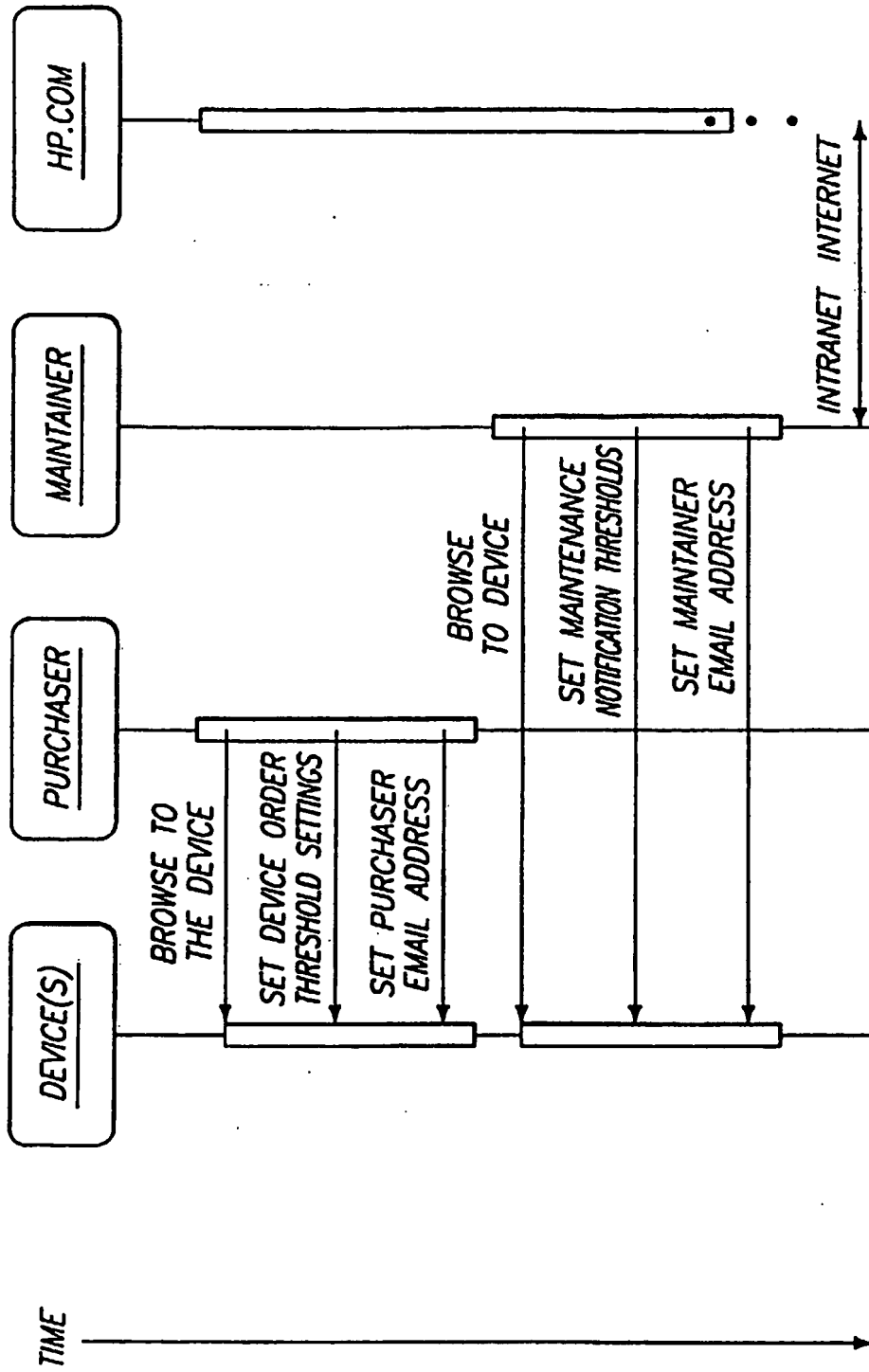
FIG. 1











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